DOCUMENT RESUME

ED 269 586 CE 044 377

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TITLE Continuing Professional Development: A Learner-Centered Strategy. FEU/PICKUP Project Report.
INSTITUTION Further Education Unit, London (England).
REPORT NO ISBN-0-948621-11-7
PUB DATE Mar 86
NOTE 65p.
PUB TYPE Reports - Descriptive (141)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS *Civil Engineering; Construction (Process); *Engineers; Foreign Countries; Models; Needs Assessment; Postsecondary Education; *Professional Continuing Education; *Self Help Programs; *Workshops
IDENTIFIERS Great Britain

ABSTRACT

A project was established to design and implement appropriate workshops for self-help groups of British mid-career engineers who wanted to attain chartered status. During the preparatory period, interviews identified the experiential learning difficulties and needs of prospective participants. Pilot workshops also identified the experiential learning needs of individuals and then met those needs. The aim of the workshops was to meet defined and emerging needs of the participants by organizing activities that depended on the participation and motivation of and preparation by participants. Although full self-help seemed unlikely to be achieved or successful, a self-help component allowed experience to be shared and individual needs to be met. Problems with learner motivation, self-management, and confidence were considerable and required frequent attention. The role of the provider varied with the need most often being for a facilitator and counselor rather than a teacher. Participants in the workshops often worked in pairs. Identified learners' needs included career guidance and information, routes to qualification, specific instruction, communication skills, requirements, motivation and discipline in preparation, and confidence. Formative and summative evaluations were conducted. The majority of participants were very positive about the assistance they received. (YLB)

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FEU / PICKUP

PROJECT REPORT

ED269586

CONTINUING PROFESSIONAL DEVELOPMENT: A LEARNER-CENTRED STRATEGY

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

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Further Education Unit

Professional, Industrial and Commercial Updating

ISBN 0 948621 11 7
March 1986

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Printed by Silverdale Press, Hayes, Middlesex

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Dear Sir/Madam,

CONTINUING PROFESSIONAL DEVELOPMENT: A Learner-Centred Strategy

I enclose a copy of the above FEU/PICKUP* report by Professor Cowan and Anna Garry of Heriot-Watt University. The project described in the report was concerned with assisting mid-career engineers achieve chartered status. This they do, in common with many others seeking this type of extension to their continuing professional development (CPD), by identifying and articulating their experience and role as professional engineers to their professional institution. This may involve the compilation of a portfolio, preparation for more examinations, interviews - or any combination of these. Whatever the form, as John Cowan and Anna Garry describe, normal teaching methods are rarely suitable to assist these adults in the ordering and structuring of their store of knowledge and experience in a way that will present a convincing case to the institution concerned. Identification of individual needs, peer-group learning, and supportive tutoring were found to occupy a central role in this learner-centred process of preparation.

Chapters 1, 3 and 5 describe the background to the project, its aims, method and the way in which it was evaluated.

Chapter 4 describes how individual needs were identified, classified and articulated. Chapter 2 describes the general and detailed findings, and formulates some recommendations. The findings will be of interest to those who wish to provide courses of continuing professional development for adults. The main message is that the use of participative workshops is essential if motivation and confidence are to be generated and if experiential learning is to be successfully exploited. The recommendations are that more support is needed and more co-ordination is required between educational institutions, employers and professional institutions.

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* PICKUP is the Department of Education and Science Professional, Industrial and Commercial Updating Programme to meet the mid-career updating needs of adults in employment.

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The continuing professional development of engineers is a major current concern of the Engineering Council and its member institutions. The FEU will be referring to this report in its discussions with these bodies, to see how its findings can be more actively disseminated.

The messages, however, are applicable to a wider range of adult learners; and we are to publish shortly, as an Occasional Paper*, a companion document by John Cowan and Anna Garry. This gives practical advice to all tutors who are interested in using with adults the learner-centred strategies that are described here.

Yours faithfully,

JACK MANSELL
Chief Officer

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* Learning from Experience - a tutor's guide to the use of small groups in CPD, FEU, 1986.

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1. AIMS AND OUTCOMES OF THE PROJECT

Background

1. The PICKUP scheme, in encouraging new strategies for adult education, provides the opportunity to explore alternative forms of provision for mature learners. The Civil Engineering Department at Heriot-Watt University was interested in establishing a project to assist mid-career engineers in the construction industry for a variety of reasons. The Department could offer expertise and contacts, principally because Professor Cowan was actively involved in the 'CPD* in the Construction Industry' Group. He was also a member of The Institution of Structural Engineers (I.Struct.E.) Education and Examinations Committee and had a personal concern with the weaknesses in the existing provision for CPD.

2. Professor Cowan held the view that much CPD provision in the construction industry is unsatisfactory and inappropriate. There are frustrations amongst course attenders who find courses irrelevant; others simply cannot find appropriate courses to meet their needs. More serious, however, is the fact that CPD arrangements are not designed to ensure and check that learning takes place or even to discover whether any learning has taken place; instead they seem to accept the philosophy that participants simply accumulate points for attending courses.

3. It seemed likely that a new approach could lead to more appropriate and effective provision for updating mid-career adults. Thus, in February 1984 a one-year project was established, with FEU funding. This set out to design and implement appropriate workshops for self-help groups of mid-career engineers who wanted to attain chartered

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* CPD - Continuing Professional Development

status. This document reports the activities, methodology and findings from that year, including some of the unexpected problems and changes of plan.

Aims and Outcomes

4. The original proposal set out a number of definite aims; it also anticipated methods of working and certain outcomes. Most of the original aims and methods chosen to achieve them were retained in the programme as it developed. But inevitably some became less significant and others needed to be adjusted. The original aims and methods are outlined below; any adjustments which were made to them in the year are indicated by the cross-hatch symbol (#).

5. Original Aims

(i) To develop a new style of learning activity which will provide effective and appropriate training for graduate engineers aiming for the professional examinations of their Institution.

(ii) To identify and meet the needs of such engineers and technician engineers and to establish an appropriate model for responding to these needs.

(iii) To prepare programmes which are individually appropriate and which take account of the needs, background and experience of each participant.

(iv) To develop the necessary teaching skills with a group of staff in order to offer programmes effectively and to summarise this experience in a communicable form.

In practice only two staff were significantly involved in the project. It proved impossible to involve a larger number because it was first necessary to:

- pilot the methodology in order to identify staff skills needed to implement it

- then carry out thorough development and validation studies

Anticipated Methodology

6. It was expected that the year would involve a number of components which would each require distinct allocations of time and effort. They were distinguished as follows:

- curriculum development to produce the new style of programme and activities

- pilot workshops and meetings

  # In practice it was first important and useful to conduct a series of individual interviews to obtain information about how experiential learning could be identified. This knowledge was then applied in the design of group situations.

- the identification of experiential learning

- a concentration on the 'learning contract' approach

  # This was certainly used, though only on an informal basis which was deemed more appropriate to the type of relationship which developed between participants and staff.

- evaluation (both formative and summative)

- staff development

- a concentration on pilot group(s) composed of engineers preparing for the professional examinations of the Institution of Structural Engineers

Many enquiries and responses were received in the initial stages from engineers seeking professional status with the Institution of Civil Engineers. These applicants were incorporated into the sample group. Thus the project widened its scope and worked with a larger number of individuals and groups than was originally intended.

- 'self-help' activities originating from, but not dependent on, workshop activities

In practice participants wanted more input and motivation than was originally anticipated and it took more time to encourage self-help activities.

- collation and dissemination of accumulated experience in a form which will be useful to colleagues working on similar projects in the same or other professions.

Additional Activities

7. The opportunity arose for the project to collaborate with an employer and a Local Regional Council and to work directly with employment-based groups and individuals. This provided valuable experience in a new environment and allowed a comparison to be made between the university-based, mixed employee groups and the worked-based ones. The result was the input to the project of an unanticipated and important dimension.

Expected Outcomes

8. Four outcomes, as listed below, were anticipated in the original proposal:

(i) a summative report - this is contained in Chapter 3 of this document

(ii) an evaluation of the project, detailed in Chapter 5

(iii) a tutors handbook, which forms a separate volume*

(iv) papers for publication, listed in Appendix 3 to this document.

Additional Outcomes

9. The project has also led to the production of detailed proposals for a self-supporting scheme for CPD which is centred on the total needs of the individual. An outline of this model is found in A New Approach to Continuing Professional Education (see reference 1, Appendix 3).

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* Learning from Experience: A tutor's guide to the use of small groups in CPD, FEU, 1986

2. FINDINGS AND RECOMMENDATIONS

10. General Findings

i) Existing provision (i.e. courses, facilities etc.) for individuals seeking CPD (Continuing Professional Development) is disparate, disjointed and uncoordinated.

ii) It is difficult to obtain important and detailed advice about courses, qualification routes and queries which arise from specific personal circumstances.

iii) Most of the critical needs of the learner are peripheral to the main discipline and are not, and cannot be, met in modular teaching and course provision.

iv) For CPD to be effective, it must identify all of the learners' needs, and design courses or programmes to meet them.

v) The varied experience which mid-career learners possess is the foundation on which subsequent development is based and therefore should be identified, built upon - and shared - wherever possible.

vi) It is possible to design learner-centred provision which meets the above criteria.

vii) It is difficult to arrange effective CPD provision which is also efficient; yet this is essential to prevent the costs from becoming excessive.

viii) There are considerable benefits to be gained from holding the activities which constitute the provision in the workplace.

ix) The support and interest of an employer has a powerful influence on the motivation, work style and learning of employees who take part in work-based activities.

x) The techniques developed for facilitating learner-centred professional development apply equally to the effective training of trainers and the development of tutorial staff.

11. Detailed Findings

i) Workshops of between 8 and 16 people were used to meet the project criteria most effectively and efficiently.

ii) Identifying experiential learning proved a difficult, though extremely important, task.

iii) A self-help component allowed experience to be shared and individual needs to be catered for. However, full self-help seemed unlikely to be achieved or successful.

iv) Problems with the motivation, self-management and confidence of the learners were considerable and these needed careful and frequent attention.

v) Workshops had to be genuinely responsive to be properly effective.

vi) The role of the provider varied. There was most often a need to be a facilitator and counsellor rather than a teacher. This is a relatively new skill for those in tertiary education, and those working in CPD have few examplars to draw upon for advice.

vii) It is often useful to have more than one provider in a given activity so that each can adopt different, and appropriate, roles.

viii) Participants identified a wide range of individual needs which demanded a variety of techniques in the workshops to satisfy them.

xi) Analysis of the individual interviews which took place in the early stages provided useful dialogue, trigger questions and patterns of response illustrating the likely needs which could arise in the subsequent workshops.

x) Participants often worked in pairs in the workshops. This one-to-one interaction ably facilitated the collection of individualistic information. Using trigger questions, the participants were able to summarise the main points of their partner's case succinctly.

12. Recommendations

i) New CPD provision should seek to identify, respond to and focus on the total needs of the learner.

ii) For CPD to be effective in initiating and achieving learning, more effort must be devoted to meeting the major needs of the learners. Often these are not recognised and usually they cannot be met by existing modular provision.

iii) Co-ordinated, detailed and responsive data bases of information should exist and be accessible to those seeking CPD.

iv) More CPD provision should be initiated with the direct support and interest of employers.

v) More co-ordination is needed between educational institutions, employers and professional institutions to pool important information and provide a comprehensive and responsive pattern of provision which is appropriate to declared needs.

Implementation

13. To implement these recommendations effectively specific action is needed:

i) More resources should be devoted to 'pump priming' which:

- establishes methodologies for identifying the total needs of the learner (including felt and normative needs and not merely expressed needs, or needs derived from task analysis);

- uses this information to pilot activities and evaluate development;

- proposes ways in which appropriate responses, in the form of new improved CPD activities, can be made by the educational institutions.

These resources should come from all possible sources of funding. Government agencies should support research of interdisciplinary significance; the professional bodies should accept responsibility for developments which are particularly relevant to their profession; and employers should support the provision once it moves beyond the piloting stage.

The Research Councils, who up until the present have not been involved, should support and encourage educational initiatives which explore the nature of learning and the consequences of learning differences in Continuing Professional Development.

ii) The Engineering Council should play a prominent role in the move towards learner-centred, relevant and effective CPD provision; in particular the Council should initiate the establishment of detailed and co-ordinated data bases along with the networking of

resources which is vital to cost-effective professional development. These data bases should extend beyond the basic information available at present and should provide satisfactory responses to all common enquiries through increased use of information technology.

The responsibility for innovation and initiative lies here and with the professional bodies otherwise there is a danger of lack of rigorous and informed scrutiny. The Council should supplement the initial developments and accept responsibility for them and for implementing the lessons learned from research and new initiatives.

iii) Employers must take more responsibility for effective updating of their employees. Learner-centred courses in the workplace can provide an excellent opportunity for highly motivated development. They are more likely to do so if provision is reliable and effective, and seen to be so. This option should be more actively explored with professional support.

iv) Educational institutions must respond to analyses of needs rather than presume them. Increasingly they must expect to function as resources rather than initiators, and as part of the total CPD provision rather than as the main source of it. Nevertheless, it is important that they take a real part in the overall initiatives or their work may become irrelevant and disconnected from the mainstream effort.

3. THE PROJECT

The Preparatory Three Months

14. This period was mainly devoted to:

- a literature survey
- research to build up a data base of information for those seeking Chartered Engineer status
- a low key advertising and recruitment campaign, to establish the groups with whom we would work
- the identification of a model for learner-centred CPD provision.

15. It was quickly established that existing CPD provision in the area was disparate, fragmentary and uncoordinated. There was no effective provision for those seeking chartered status.

16. From the response which was received, it was obvious that there was a definite demand and need for advice and provision. Though we advertised only once, we continued to receive enquiries throughout the year and by February 1985 had dealt with over 100 people.

17. It had originally been anticipated that the project would work with a group of 10 - 15 engineers seeking assistance in preparation for the I.Struct.E. Part 3 exam or the Mature Candidates Route. Because of the large response, the number of groups which were established grew and the projected widened its scope to work with engineers seeking chartered status with the Institution of Civil Engineers (I.C.E.). The requirements for membership of the I.Struct.E. and I.C.E. are outlined in Appendix 4.

18. An enquiry had also been received from a local authority employer, concerned about one of his employees who had failed the I.C.E. examination a number of times. The resulting discussions lead to the establishment of a number of work-based groups preparing for the professional examination. (See reference 5, Appendix 3.)

19. By the end of May 1984, four prospective groupings had been identified, and plans laid to establish them. In the main, the groups were divided according to the route to chartered status for which the were eligible, the exception being the work-based group. (See Table 1)

TABLE 1: Groups which participated in workshops 1984/85

Type of Group	Institution of Application	Number of Participants
Graduate engineers	Institution of Civil Engineers (I.C.E.)	16
Graduate engineers	Institution of Structural Engineers (I.Struct.E.)	16
'Mature' non-graduate engineers	I.C.E. and I.Struct.E.	15
Mixed group of graduate and non-graduate engineers and non Civil Engineering graduates in the Local Regional Council	I.C.E.	12

As the year progressed, other groups were formed in the office of the Regional Council which resulted in a total of three groups there.

20. A paper describing the educational philosophy of the project was prepared and was presented in December 1984

at a session of the conference 'Continuing Education for the Professions', organised by the Society for Research into Higher Education (Appendix 3, reference 1). The paper outlines a learner-centred approach to CPD and suggests how it can be achieved.

Designing the Provision: Interviews and Workshops

21. An effective CPD provision should identify and respond to the needs of the learner. It must therefore include a stage where this identification can be achieved enabling the provision to become truly responsive. This was one of the major challenges which the project faced. The middle period of the project was devoted to meeting this challenge.

22. Identifying individual needs on a one-to-one basis proved time-consuming and difficult. It would also not be cost-effective on a large scale. It was important, therefore, to use the results of individual interviews to design group situations which could both produce a representative picture of individual needs and do so in a cost-effective way.

Experiential Learning

23. In the United States the identification of experiential learning (the accumulation of learning from past experiences) is considered an important means of accrediting past learning for entry into colleges and universities. The value of the process of experiential learning (learning through action) to educational advancement is also important; but it was the former type of experiential learning with which we were concerned.*

24. Identifying experiential learning provided a basis from which to begin. Each individual possesses a very different accumulation of experiential learning.

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* See, for example, Curriculum Opportunity, FEU, 1983

Identification of that learning, which is related to their CPD aims, has a number of functions:

- at the outset the learner produces for him/herself a statement of experience to date;

- the provider also has that statement of experience at the beginning and can constructively build upon it in the provision which follows;

- the learner can more readily begin to identify future goals and needs.

25. It was clear that identifying experiential learning would be a difficult task. This was why the opportunity was taken, in the early part of the project, to meet some of the enquirers individually.

The Interviews

26. In the interviews, individuals from the non-graduate group provided the most useful information. Their route to chartered status demands that they produce a 10,000 word report which demonstrates their grasp of the basic principles of engineering science. They have to choose the subject of their report themselves and this topic is usually drawn from some part of their long years of experience. Thus the nature of their route requires them to identify their experiential learning and then choose some part of it to fit in with the demands of the examination process.

27. Interviews with prospective candidates brought to light a number of difficulties:

- Individuals found it difficult to confine themselves to talking about information which was relevant to their aim.

- They could not comprehend the requirements of the route, even if it was explained to them many times during the meeting or meetings.

- They came with inaccurate preconceived ideas about the requirements and their needs, which it took time to correct.

- Many found it important to take time to establish their worth as individuals.

- They found it very difficult to recall relevant information which would help them find a topic for the report.

- It therefore became vital to find 'trigger questions' which prompted them to recall the relevant experience.

- In order for the information produced in the discussion to be fruitful, it was necessary for the interviewers to demonstrate their respect and appreciation of the interviewees as individuals.

- Some were uncomfortable with the aims and requirements of the Mature Candidates Route because they were so alien to their work practice.

- Quite a few were depressed by the existence of what they considered to be insurmountable barriers to them obtaining chartered status.

28. These interviews were a vital source of information about the difficulties and needs of learners who had approached the project from industry or local government. The importance of having trigger questions as a means of assisting individuals to concentrate their thinking processes was demonstrated. In addition, interviewing the mature engineers provided warning of the difficulties that members of such a group could experience in adapting to

the more academic requirements of the Mature Candidates Route.

The Workshop Programme

29. The recruits who were not interviewed agreed to take part in the pilot programmes of workshops. These began with a planning workshop in which the experiential learning and the needs of individuals in the group were identified, and was followed by a series of workshops to meet these needs.

The Planning Workshop

30. The main purpose of these introductory and exploratory activities was to identify individual and group needs, and to respond immediately with suggestions for the type of workshops which could be held to meet them. As part of the process, the participants were also supplied with detailed information about the routes to chartered status which they were attempting to take.

31. Individual statements of past learning and of current needs were one important product of the planning workshops. These needs became more explicit and detailed as the individuals took part in the workshop programme. The affective needs proved more important than anticipated for all groups. The participants were often seeking not only information and training but also motivation, confidence and encouragement. (See Chapter 4 for detailed analysis of needs).

32. The other product of the planning workshops was a picture of group or common needs which the programme could attempt to meet. In most cases a group programme was provided in response to the summaries produced in the planning workshop, but there were two notable exceptions:

> One of the planning workshops in the Regional Council revealed such disparate needs amongst the employees seeking chartered status that it became

obvious that it could not operate as a group. A number of suggestions for individual self-help activities were made.

The mature candidates planning workshops did lead to another workshop. However the needs thereafter were highly individualised. The only reason for the participants to meet again in a workshop would have been to generate motivation, which could not be a reason in itself. They have proceeded with self-help and direct tutorial activities.

The Programme

33. A comprehensive list of the project's activities for 1984-85 is given in Appendix 1.

The aim of the workshops was to meet defined and emerging needs of the groups by organising activities which depended on the participation and motivation of, and preparation by, the members of the group. The pattern of events varied between the groups for a number of reasons, which will be identified by examining each group in turn.

The Mature Candidates Group

34. This was a group of individuals wanting to develop but feeling that society and the institutions were conspiring to keep them in their place, and that there was little chance for them. They were faced with the opportunity of a bridge to cross to chartered status - but were acutely aware that it could prove a very difficult one. They were sceptical of what we had to offer and very negative, in their initial reactions, at the first workshop.

35. It proved a surprise when 15 out of 16 returned for the second workshop of that group (although 3 had done none of the requested preparation). Following this second workshop:

1 is now studying for a part-time MSc
2 have submitted their applications
1 is too young to submit an application
3 are continuing to correspond and prepare
1 was already a chartered engineer of another institution and so could avoid this route and qualify in a different way
2 cannot afford the time at present

We have not corresponded further with the other 5 members.

36. The nature of this kind of group is that they find it difficult to keep up the commitment and motivation. It often seemed that a particular participant had given up then, suddenly, there would be another burst of activity and interaction.

The Graduate Group, seeking Chartered Status from I.C.E.

37. These were individuals who had, for some reason, failed to take the professional exams at the normal time. (Only 3 out of 16 were young engineers who had not completed their training). They were seeking assistance, but also confidence - and, most significantly, motivation.

38. The workshops were held during the working week. Only 8 out of the original 16 attended the first one, even though 14 were expected. The second workshop was only attended by 5 who have since continued to meet regularly.

39. The motivation of this group was very low. Indeed it was so low that we could not stimulate much change. It is difficult to know why so many dropped out but at least 3 spoke of time commitments and 1 moved away. There were also problems negotiating the time off work.

The Graduate Groups at the Local Regional Council

40. We were involved with three groups and continued to work with two over an extended period. One was discontinued for the reasons explained above. Here we had a

relationship with the employer as well as the employees. The employer supported and encouraged the activities on the principle that:

> 'If the employees were prepared to spend their own time on their education and training, the employer was prepared to support their efforts by giving them further time to do so during working hours.'

41. We worked with 25 employees in all. Most members of the two groups met all the requirements for application to I.C.E., and an enormous difference in motivation and commitment was displayed compared with the other Graduate group described above. There was high attendance at the workshop (at least 4 out of the group of 5, and 12 out of the group of 15) and the majority of the members met their commitments with regard to preparatory work.

42. The initial motivation was high and the workshops generated further motivation, even though only two members of the essay group of 15 were submitting their applications for the professional examination of I.C.E. in the immediate future. However, most of the participants were lacking in confidence. It was found to be very important to recognise and consider this in the running and planning of activities.

43. The employer-employee-university relationship reduced and combatted many of the problems with affective needs which we had encountered with the other groups. Collaboration was very much at the basis of this relationship.

<u>Graduates seeking Chartered Status from I.Struct.E.</u>

44. This was a group of individuals, the majority of whom were going to sit the Part 3 exam in spring 1985. Their motivation was high and the workshop attendance was also good. They were less confident of the self-help aspects and more concerned to acquire as much information and advice as possible.

45. The presence of a person whom they viewed as an expert prevented them from seriously attempting active and independent learning. They preferred and hoped to receive advice and instruction, rather than develop competence.

Individual Needs

46. New needs emerged in every case as the groups or individuals continued to take part in the programme. However it should be stressed that, for all involved, the affective needs were critical and had to be considered in all planning and facilitation.

47. Motivation was crucial: lack of it hampered group and individual success by disrupting group dynamics and slowing down progress. The providers could not input adequate motivation unless members were prepared to respond to vicarious motivation. The problem was less critical in the work-based groups.

48. Confidence was lacking in most participants, even the very competent. It was crucial to consider this in all activities.

49. A more extensive analysis of the needs of mid-career learners is contained in Chapter 4.

The Self-help Dimension

50. It had been anticipated that a major part of the programmes would involve an aspect of self-help; that is the participants would spend time on independent study, would direct their own learning, would share experiences, and comment upon and constructively discuss other participants' work.

51. This proved difficult to achieve for a number of reasons:

- home and work commitments led members to seek direction and motivation. They did not feel they had the time to direct their learning independently;

- the sharing of experiences had, at first, to be carefully encouraged by the style of workshop. It was very slow in occurring independently;

- members were more familiar with activities in which the providers are considered to be the experts, and they tended to look to them, rather than their colleagues, for confirmation of any comments and criticism;

- it is very difficult for groups to develop a relationship in which they can be constructively critical. It takes time and encouragement for this to be successful;

- many were not confident of their abilities and achievements and thus were reluctant, and felt unable, to comment on other participants' work.

52. Nevertheless, recognising these limitations, aspects of self-help were very useful in the activities. In one work-based group, which had been self-initiated and had worked together over a long period before participating in the projects programme, it already worked well and was built upon in the subsequent workshops.

53. In another group, the nature of the individul goals in the Mature Candidates Route demanded self-directed study. Most of the other groups have undertaken study and interchange between members through the direction of the project. In these and the other work-based group, however, independent interchange of information began to grow.

54. The participants sought, and in most cases needed, the direction provided by a facilitator. On a simple level such facilitation presented an effective structure, managed the interchanges which were occurring, and prevented time being wasted on debates which could have

frustrated other members. Self-help did play a part which was important in different situations and to different degrees for each participant.

The Role of the Providers

55. This was a very demanding role in which we had to:

- be mainly facilitators of learning
- learn to work as a team
- spend very little time simply teaching.

Staff Development of the Project Team

56. Using new teaching methods had a significant effect on us, the staff of the project:

(i) We were a team of only two entering the project from different experiences.

(ii) One member was very experienced in CPD activities in a different sphere i.e. the training of university teachers. The other had no experiences of CPD. Both had experience of small group activities. Hence our own self-development was ad hoc and, we believe, rightly so.

(iii) We arranged and made time for various means of ensuring our own self-development. This involved:

- deliberately experiencing and monitoring different roles
- detailed debriefing and formative evaluation
- an informal but structured form of co-counselling

57. Thus the main elements of our development occurred through active learning in new situations and without advice from the literature. However development was enhanced beyond the natural/intuitive programme by structured discussions, separate from the routine programme, in which we attempted to rationalise, generalise and explore contrasting perspectives.

The Training of Trainers or Tutorial Staff

58. The methods used in the project could, with small modification, apply equally to the training of trainers or tutors. Such individuals bring to their learning situations a wide range of experiences and needs, which should be identified and built on. (This suggestion is outlined in a section, by the project team, for a book proposed by Norman Evans; Appendix 3, reference 4).

Staff Development for Others

59. We regularly recorded information and ideas which could be offered to others, in all professional spheres, who are attempting to facilitate professional development. We have compiled this advice in the handbook which is published separately (see footnote, page 5). Much of the information therein may seem obvious but it is nevertheless vitally important for effective implementation of activities. As, in our experience, it is often the most obvious things which are the most easily forgotten, we feel that they are worthy of careful and detailed exposition.

60. On the broader issue of staff development policy for people like us, we would stress that the situation is very similar to that of our CPD participants. The difference lies in the degree to which the developer seeks (or can seek) external assistance. This can be demonstrated by examining the two stages involved.

1. Scrutiny of needs - after which individuals have their own aspirations and loose statements of needs.

2. Achieving development - through specification of needs, the definition of a programme to meet them and a certain amount of self-directed development.

61. These two stages are common to all who are developing professionally. It is, however, in the second part of the process that differences occur. The participants in everyday workshops need external facilitation to encourage self-development and, similarily, trainers being trained need external guidance. But those who train the trainers, and are developing in situations similar to our own, cannot look to someone above for facilitation; they must seek facilitation and interaction with their peers. Thus this situation is one which calls for different kinds of structured reflective activities; and the potential for self-help is greater, as there is no possibility of finding help outside the peer group.

62. As a footnote, we would point out that it is only when you are at the forefront of knowledge and practice that you are obliged to learn from, and give to, your colleagues. Where other options are possible, as in CPD workshops and courses, and in the training of trainers, it is only human nature to look to authorities to provide assistance and instruction, authoritatively and effectively.

Evaluation

Formative Evaluation

63. Each workshop and meeting was examined critically after the event by the two project workers in order to:

- compile a factual account of all that had happened;

- identify the sources of any problems or successes;

- consolidate learning and carefully identify the reasons and processes involved;

- brainstorm any improvements which the experience had suggested.

The questions which were asked included:

Did the event respond to all the needs?

Did it achieve each intended outcome?

Was the overall objective achieved? Did it seem likely to be, at some later date?

What were the participants' opinions and feedback?

Was the structure successful? In what ways?

Did the facilitators adopt effective and complementary roles?

Were the resources adequate?

Was the group atmosphere conducive to progress?

This evaluation always generated suggestions for improvements and changes.

Summative Evaluation

64. This was the period during the project when:

- the original aims were reassessed and compared with what had actually been achieved;

- a questionnaire was devised and circulated to the participants to get their comments;

- the report of our findings was produced.

65. Approximately 42% of the participants in the project returned the questionnaire. An analysis of their responses is found in the detailed evaluation in Chapter 5. The majority were very positive about the assistance and provision which they received. Their main disappointment was more that the project was not able to offer more workshops and provision.

Findings Specific to the Construction Industry

66. There were a number of findings specific to the construction industry:

- Many unchartered engineers and technicians are resentful about the exclusive nature of the professional examination, particularly because it appears to be the whole focus for Continuing Professional Development.

- The need for extensive CPD amongst engineers is confirmed by existing criticisms of certain aspects of professional competence. Yet chartered status is the only tangible goal to which an engineer can aspire because there is no acknowledgement or accreditation of general professional development.

- A number of specialists are working in Civil Engineering posts and find the hurdle of the Engineering Council exams virtually insurmountable, yet an essential preliminary, before they can even apply for chartered status with I.C.E. They feel that, as many Civil Engineering jobs involve specialism, more account should be taken of this - and the C. Eng. status should not be as tightly specified.

- Some engineers are doubtful of the value of professional exams and see them as a contrived way

of assessing the worth of an engineer.

- There is a great deal of misinformation, misunderstanding and confusion among engineers in industry about the requirement for the professional examination.

- It is very difficult for an engineer to find information about the requirements of the Institution and very easy to miss vital data important to his or her situation.

- Local branches or regions of professional institutions are voluntarily run and cannot be expected to provide the counselling and information service which would be necessary to ensure that there was effective CPD provision.

- The real needs of the learners, as identified by the project, are not met in any of the existing courses.

The Future

67. Building upon the experience of 1984/85 the project team is working to establish a local collaborative project in the East of Scotland to meet some problems which have been identified. It is clear that:

- there is a strong case for flexible and responsive data bases giving advice on courses and opportunities for CPD. Ideally this should be computerised;

- there is a need for co-ordination or 'networking' between employers, educational establishments and professional institutions to identify needs and enable the efficient transfer of information. The proposed project mentioned above is intended to contribute towards meeting this need.

4. AN ANALYSIS OF THE NEEDS OF MID-CAREER LEARNERS

68. An important aspect of the development of learner-centred activities is the identification of learners' needs. Much information of this type was gathered in the PICKUP project as the self-help workshops for mid-career learners were developed. Though the sample cannot be considered wholly representative of CPD learners, an analysis of their needs provides surprising and thought-provoking information which suggest that many of the major needs of learners are not catered for, or recognised, in existing provision. The writers therefore feel that it is important to report these findings and offer an opportunity for them to be discussed.

Data Sources and Collection

69. During the period February to October 1984 the project members were in contact with approximately 100 engineers who live or work within 120 miles of Edinburgh. These people responded to an offer for assistance, which was made by Heriot-Watt University, to those seeking chartered status with the Institutions of Civil and Structural Engineers.

70. The data was collected from a range of sources: telephone enquiries and requests for advice; individual interviews; and workshops specifically designed to identify and then to resolve needs. A record of each person's queries and needs was made from which the data was readily extracted for the purposes of this report.

Types of Needs

71. When identifying learners' needs, three distinctions can be employed. Learners have expressed, felt and normative needs. An expressed need is one which the learner is aware of and willing to tell others about. A felt need is one of which a person is aware but which he or she prefers not to discuss. (This category can be transient because, in the right circumstances, learners may be encouraged to

express their needs; they are then no longer merely felt). A need which the learner has by reference to other similar individuals but of which he or she is unaware is normative. This can only be identified either through outside diagnosis or through an experience which turns it into a felt or expressed need.

72. The writers were aware of and influenced by these categories but did not use them in their analysis because they are more appropriate to a study designed specifically to analyse needs. They were not helpful when attempting to make specific comments about the type of data gathered.

Classification of Needs

73. Eight descriptors of the participants' needs were chosen and are used as a basis for data presentation in Table 2. The descriptors in the table are personal to the writers and the sample with which they worked. It is therefore important to explain their meaning. This will be done by using a short illustrative example under each category:

Careers guidance and information

'My first degree is in geography and I have an MSc in transportation studies. I am working in an engineering department for a local authority. The way ahead of for me is barred unless I can obtain chartered status. What should I do?'

Clarification about routes to qualification

'What are they really looking for in the report which a mature candidate has to submit?'

Specific instruction provision

'I don't really know anything about common law. I notice that the PE1* essays often ask about it. Where can I learn what I need to know?'

Assistance with communication skills and presentation for the Professional Exam

'No-one has ever really taught me to write technical reports. I know that I do this badly. I try hard to do better - but I need some help if I am to make an appreciable improvement.'

Correction of inaccurate knowledge of requirements

'I thought I only had to provide a report to the Institution of my work experience, and that this was all that was required for the Mature Candidates Route. It is difficult to understand what they mean when they fail me because of my report did not demonstrate knowledge of the basic principles of Engineering Science.'

Motivation and discipline in preparation

'I've started this report a dozen times - but always my enthusiasm and my effort fall off after I've hit the first real difficulty. I need the kind of contact which will keep me going, help me to believe that it is possible for me to reach a successful conclusion.'

Confidence

'I have spent a lot of time on preparation for the exam but I really don't know if I will be able to pass. I seem to have very low confidence.'

---

* PE1 - Professional Examination 1

Omissions

'I work for a plant hire firm, I've never had any real design experience, I don't see how I can change my job at the moment - and I see no prospect of getting design experience in the future.'

Clearly, as in this last example, there are always needs which it is not possible to meet.

Comment

74. The writers were frankly astounded by the extent to which they encountered negative feelings and unfortunate experiences. Many of the engineers who were interviewed, or who took part in the workshops, reported genuine frustration in their attempts to obtain detailed information and advice which would help them to make decisions on further careers. Many were acutely aware of their incompetence in respect of communication skills and saw no hope of finding a way to overcome that weakness or develop the necessary abilities. Most therefore looked to the system, whatever it was, to provide leadership, discipline and an environment in which their motivation would develop and their confidence would grow.

None of these needs is specifically addressed in most forms of CPD provision currently on offer.

Discussion

75. The present provision for CPD in the United Kingdom is erratic and piecemeal. Educational institutions and occasionally the local associations of the professional bodies offer isolated modular courses, which address themselves to one particular aspect of the needs to be found within the target population. It is left to the individual learners to seek out these bits and pieces of CPD provision and to blend them together to form a total programme for him/herself. Even where an organisation arranges a thorough training provision in-house, the needs

which extend beyond the workplace are seldom integrated into the total training activites.

76. As long as the present structure for continuing professional development continues to exist, it is difficult to see how the weaknesses in it and the frustrations felt by learners can be eliminated. What is required is a provision which is designed to focus attention on each individual learner and to start from that point, rather than from the consideration of modular courses which might usefully be offered by providers, whether educational institutions or otherwise.

77. However, it is also important that each learner can draw on existing knowledge and experience rather than beginning entirely alone. Thus it is vital that activities be supported by appropriate and accessible data bases and by active collaboration between employers, educational inaititutions and professional bodies.

78. Initiatives are needed to recognise the importance of data bases for learners seeking professional developments who, as Table 2 shows, have a great need for accurate, up-to-date information. Data bases should be designed which are responsive to expressed needs, update enquirers knowledge, and are accessible to CPD learners. Active collaboration between employers, educational institutions and professional bodies is also crucial in that it enables the identification of needs, the design of appropriate provision to meet these needs, and updating of information about provision in an area. It can also prevent needless duplication of provision, and ensure effective and efficient use of resouces.

Summary

79. The analysis which has been presented suggests that taught courses are a relatively minor part of the total provision for continuing professional development which is required in the engineering profession. It is obviously desirable to focus on the total needs of each individual learner and

to design provision which will respond to all of these needs in so far as that is possible. This can be achieved through the establishment and support of self-help groups within the workplace, or perhaps by linking employees of a number of small employers.

TABLE 2: Analysis of the needs of participants 1984/85[1]

Careers guidance and information	6
Clarification about routes to qualification	78
Specific instructional provision	6
Assistance with communication skills and presentation for professional examination	55
Correction of inaccurate knowledge of requirements	18
Motivation and discipline in preparation	22
Confidence	33
Omissions	8

TOTAL NUMBER OF ENQUIRIES AND PARTICIPANTS = 106

[1] All the needs of each participant were aggregated, and thus the total of needs in the table is greater than the number of participants. There were some participants against whom only one need was recorded; however it was generally the case that most had more than one.

5. EVALUATION OF THE PROJECT

80. The evaluation of the project was carried out both formatively and summatively. This section outlines and discusses this evaluation and the important role it played.

Definitions

81. Formative evaluation describes a process designed to monitor activities in a project and to bring about changes and improvements in their quality as the programme develops.

Summative evaluation is the process, at the end of any project, which is designed to review its total achievements in terms of its original aims and outcomes.

Formative Evaluation

82. This was a dynamic and ongoing activity which was central to the development of the project. The formative evaluation examined the successes and problems of the workshops and meetings which were conducted. It was, and must be, an important part of any programme which effectively responds to learners' needs. For that reason the process will be described in some detail.

83. Each session of formative evaluation focused on:

- compiling a factual account of the event which had occurred

- examining the sources of the successes, and of the problems

This was done by concentrating on the planned

- aims and outcomes
- timetable of the event

- resources
- roles of the tutor/facilitators

and comparing them with the practice. Another important factor was the immediate responses and feedback received from the participants. Each of these factors will be discussed and illustrated in turn.

The aims and outcomes

84. The aims were normally based upon identifying the needs of the participants and/or meeting needs which had already been identified. The evaluation process examined:

- whether each outcome had been achieved
- whether they had appropriately met the declared needs
- any other needs which had emerged

The information gathered was fed into the plans for the next activity.

The timetable

85. The timetable was planned in detail before each event was run and the facilitators used it as a checklist for the structure. Though a time period was allocated to each activity on the timetable beforehand, it was realised that this was likely to be adjusted in practice. As the workshop proceeded, the actual time spent, in comparison to that which had been intended, was noted. Therefore, after the event, the following questions could usefully be asked:

- How different was the timetable in practice?
- Were the changes necessary?
- Were they deliberate?

- Did they work?

- What can be learned for future activities?

86. The timetable was often adjusted. Often activities were given longer than originally intended either because the participants wanted to ask questions of the facilitators or because a dynamic discussion was occurring which it would have been unwise to terminate. Other parts of the timetable became less important and shorter. Sometimes the order of events was altered to something which seemed more appropriate to the circumstances as the session proceeded. This was discussed fully afterwards and was more often a feature of earlier workshops. At other times the order was changed by mistake. Afterwards the reasons for its occurrence, the effects it had caused, how it had been dealt with by the facilitator, what it said about the way they operated as a team, and whether it had been an improvement were discussed in detail.

The resources

87. These were carefully organised before the event, but evaluating their use in practice was important. Questions were asked about:

- the seating arrangements

- the room used

- handouts and materials

For example, it became obvious in one early session that too many explanatory handouts had been produced and their use was becoming distracting and detrimental. In fact, as the format of the workshop was alterable to meet emerging situations, a number of them were not used. But it was the evaluation afterwards which consolidated this finding and thus affected subsequent sessions.

The roles of the tutor/facilitators

88. This was vital to the running of the events. A significant amount of time was spent considering the roles each tutor should adopt, whether they had adopted it successfully and the improvements which needed to be made. A good example was provided in one workshop where the participants were expected to engage in active learning. Because one of the facilitators was an expert in the subject matter, they wanted to sit back, listen and take advice rather than take part. A quick discussion between the tutors recognised the problem and a new approach was attempted immediately. The expert left the room each time the participants were asked by the other tutor to work on their own. This encouraged them to be self-reliant and to attempt the problem seriously. The effect of this finding about the roles of tutors and the implications for future activities were discussed in detail after the session.

The responses and feedback of participants

89. At the end of each session, the participants were asked to list any needs which they felt the session had not tackled. These would then be incorporated into the workshops which were to follow. It was considered to be a good feature of the structure that participants did take time to make comments and suggestions, and in addition provided positive feedback about the successes.

Summative Evaluation

90. This was carried out at the end of the project and involved the composition, circulation and analysis of a questionnaire to all the participants and the writing of the final report and documents. It was not possible to measure the project's achievements through examination success or failure because only a few members of the group actually sat the examination in November 1984. The rest are preparing themselves for future years.

The questionnaire

91. The questionnaire has been mentioned briefly in the report; a copy is included in Appendix 2. In this section its findings will be analysed and discussed more fully. Given the limitations of questionnaires, it provided certain detailed and useful information. However, it is important to consider its limitations because the information from any questionnaire and its interpretation is a product of a number of factors: the choice and wording of the questions, the number and cross-section of the sample who choose to respond, the way they interpret the questions, and the way the person who analyses the results selects and interprets them.

92. The questionnaire was distributed to the 106 people who had made enquiries to, and/or participated in, the project from February 1984 to February 1985. 45 individuals returned completed questionnaires. This produced information on the age of the people in the sample, their employment, their reasons for seeking the assistance of the project, and their positive and negative responses to the provision. These have been tabulated below.

TABLE 3: The age range of the sample[1]

Age	20 - 29	30 - 39	Over 40
No. of respondents	20	20	5

[1]The age range of those who replied is not fully representative of the 106 individuals who participated in the project. 30% of these were over 40 whereas only 10% of those who responded to the questionnaire fell into this category.

TABLE 4: Range of employers in the construction industry[2]

University	Consultant	Contractor	Local Authority	Offshore Design Contractor
1	15	3	23	2

[2] The number of participants who worked with contractors was greater than this table suggests, though the greater proportion of the total did work with either consultants or a local authority.

TABLE 5: Reasons for becoming involved in the Project[3]

To get advice on routes to C. Eng.	5
Assistance in preparation for examination	23
Interested in becoming C. Eng.	8
To build upon existing preparation	1
Take opportunity for assistance with essays	8
Trying to set up better training for engineers in the workplace	1
Graduate of Heriot-Watt University	1

[3] Tables 5 - 9 are a collation of certain information which the respondents provided. It is difficult to attach any strong meaning to the numbers in the tables because each respondent has placed different interpretations on the questions. Faced with a list of the headings in the tables, and asked to mark those appropriate to them, they might have wished to be included in other categories as well. The tables are most useful for providing information about the factors a group in the construction industry seeking assistance would, and did, find important.

TABLE 6: Interaction with the Project

	Number involved
Telephone enquiry	15
Seeking advice	19
Individual Meeting	9
Workshop	36
Correspondence	11
Presentation for Examination	10

TABLE 7: Number of sample found the Project:

Helpful	Informative	Supportive	Motivating
35	33	20	26

TABLE 8: Disappointments with Project

None	16
Wanted more meetings	6
Difficulties in workday attendance	2
Individual points which are non-classifiable	12

TABLE 9: Some of the best parts of involvement in the Project

Assistance with essay writing	10
Trial examination	5
Exchange ideas and discussion with others	7
Advice on submitting examination application	3

Explanation

93. The questionnaire produced a wealth of individualised information. Some parts of it were classifiable and these are produced in the tables above. The response was valuable for both the general findings and for specific comments which individuals made and which are important in the future work of the project team. The discussion which follows recognises the caveats expressed in the beginning of this section about the questionnaire, and also those mentioned in note 3 of the tables.

General findings

94. The majority of the sample found the project a positive experience (See Table 7). As many as 16 stated that they had no disappointments (See Table 8). Of those who expressed some disappointment, at least 6 simply wanted more workshops. It was not possible to supply any more within the remit of the project. The number in this category could have been larger if a question on this matter had been included in the questionnaire.

Specific comments

95. Much of the rest of the information was individual, or was mentioned by a small number of the respondents. Nevertheless this data is valuable to learner-centred projects because it gives a cross-section of responses which are likely to be met when working with individuals seeking CPD, particularly in the construction industry.

It provides pointers which could merit further investigation. For that reason some of these comments are quoted here.

96. Two individuals in the sample reported that they found it difficult to attend workshops held during the working week. This was worth noting because other participants had expressed this difficulty orally during the year. Moving in the direction of work-based activities is, in part, a means of meeting this problem.

97. Other disappointments which were expressed could only be met through further provision or individual attention. This information is more relevant to formative evaluation. For example:

> 'I would have liked to have been given more rule-of-thumb methods for use in the I.Struct.E. exam situation'.
>
> 'I would have liked more interaction with successful and unsuccessful examination candidates'.

98. Individuals also outlined what they considered to be the best aspects of their experience with the project. It was difficult to find a pattern in the information which they provided. Table 9 shows that there were a few areas in common. However it was often the individual comments which provide heartening and warm feedback to the project team about the successes of their learner-centred approach. To quote a few:

> 'In general terms - the positive attitude which prevailed in the workshops'.
>
> 'To see the endeavours of others and draw comparisons with my own endeavours'.

'Meeting others in a similar position and hearing their efforts and disappointments and realising I was not alone in the struggle to chartered status'.

'On several occasions it helped me to find more suitable engineering solutions to some of the working problems in which I was involved at the time'.

'To find out that there is a body that does care about people "caught between ships" for one reason or another'.

'May I take this chance to thank you for your invaluable help'.

There are too many to quote but it is important to note that the table cannot do justice to this kind of detailed feedback.

99. A number of comments critical of the arrangements for career development in civil engineering should be quoted. These are factors which could influence the success of CPD provision, and of those who take part in the provision. As these negative thoughts were expressed by those who took the trouble to complete the questionnaire, and had taken part in the project, one wonders what the other employees felt. To quote examples:

'The field of in-career preparation for professional examinations is underdeveloped'.

'The openings for career development in a local authority, once chartered, are limited to a greater or lesser degree. The fact that the salary scales are short means that one moves quickly to the top of the scale and then effectively stagnates'.

'Pay scales are often not conducive to motivation because, in many cases, non-qualified people can earn just as much as qualified ones'.

'Because my degree is not in Civil Engineering the system determining routes to chartered status immediately penalises me. The local government salary system is tied to that system. Is it right that straight Civil Engineering degrees, with slight specialisation in the final year, should be recognised in preference to more specialised relevant degrees?'

'The I.C.E. exam is a farce'.

'It was very gratifying to find someone who took an interest in people on the wrong side of the Chartered Status wall'.

'I still wonder if I.C.E. membership is worthwhile and still have serious doubts'.

'There is a vacuum in working organisations between the draftsman, the technician and the Chartered Engineer'.

'I am not on any training agreement and therefore get no assistance in preparing for the Professional Exams'.

100. These comments suggest, though they cannot be claimed to be representative, that the situation of people seeking Continuing Professional Development in the construction industry, certainly merits further and rigorous investigation to identify the needs, aspirations and barriers to advancement. The information collected in this questionnaire provides an interesting start to that process and surely demonstrates the need to discover more.

APPENDIX 1: SUMMARY OF PROJECT ACTIVITIES 1984-1985

WITH INDIVIDUALS

Interviews	30
Counselling and tutoring meetings	25 (approx)

WITH GROUPS

Workshops at the University

Number of groups	3
	No. of Sessions
Planning workshops	4
Programme workshops	
Graduates	6
Mature Candiates	1
I. Struct.E.	2

Workshops in the Workplace - Fife Regional Council

Number of groups	3
	No. of Sessions
Planning Workshops	2
Programme Workshops	
November Candidates	2
Essay Writers	10

TOTAL NUMBER OF PARTICIPANTS 106

APPENDIX 2: EVALUATION QUESTIONNAIRE

Name . . . . . .

Address . . . . . .

. . . . . .

(We really would appreciate it if you fill in the above section. However, if you do not wish to do this, we would rather have your comments anonymously, than not at all).

Type of Employer: Consultant/Contractor/Local Authority/Other (Please specify)

Age . . . . . .

Length of Work Experience:

How did you first hear of our PICKUP programme?

Why did you decide to approach us or to respond?

What has your involvement with us been?

Telephone enquiry/Seeking advice/Individual meeting/Attendance at workshop/
Correspondence/Follow-up to workshop/Presentation for examination/
Presentation for consideration as a prospective member/Other (Please specify)

We are interested to know if the project has been useful or helpful to you - and if so, in what ways? Here are some suggestions of how you could provide us with useful information. Please add comments or delete items which are not relevant to you, so that the account conveys your impression of your involvement with our programme.

I was involved with the programme briefly/on a number of occasions/
quite extensively/on activities which are still continuing.

I found the project a helpful/informative/supportive/motivating
structure within which I could work.

The best parts of my involvement with the project were:

My biggest disappointments with the programme were that it did not:

I am/am not continuing with my professional development interests because:

(If I am continuing) I summarise the help which the project has given me in this as:

(If I am not continuing) I summarise my involvement with the project as:

I decided to/decided not to continue my involvement because:

My views about career development and opportunities have changed/ not changed as a result of the programme. Please explain.

The aim of this questionnaire has been to help you to tell us as much as you can about your experience of this project, its weaknesses and its strengths. Please use the space which follows to add comments on any matters where we have not asked questions, and on which you would wish to provide feedback to our sponsors.

APPENDIX 3: PUBLISHED PAPERS

1. GARRY, A. and COWAN, J. A New Approach to Continuing Professional Education Paper presented to the S.R.H.E. Conference 'Continuing Education for the Professions', December 17-19, 1984.

2. GARRY, A. Tutor/Facilitator/Counsellor - New Demands on Course Providers Presented at the S.R.H.E. Conference 'Continuing Education', December 18-20, 1985.

3. GARRY, A. and COWAN, J. A New Model for Continuing Engineering Education To be presented at the World Conference on Engineering Education, Florida, May 7-9, 1986.

4. COWAN, J. and GARRY, A. The Identification and Use of Experiential Learning in Continuing Professional Development Activities in Report on FEU Project RP 231 ('Assessment of Experiential Learning')

5. GARRY, A. and ROWSON, J. Self-Help CPD Groups in the Workplace I.C.E., 1985

APPENDIX 4: MEMBERSHIP OF I.C.E. AND I.STRUCT.E.

(Extract from Careers in Civil and Structural Engineering published by the Civil Engineering Careers Service).

HOW TO BE A CHARTERED ENGINEER (July 1985)

To become a Chartered Engineer you will need academic qualifications, training and experience in the civil engineering industry, and professional qualifications...

PROFESSIONAL QUALIFICATIONS

In the field of civil engineering, professional qualifications are awarded by the Institution of Civil Engineers and the Institution of Structural Engineers.

THE INSTITUTION OF CIVIL ENGINEERS

Student Member

When you start an approved degree course at university or polytechnic you may become a Student member of the Institution of Civil Engineers. The Institution has student liaison officers at all universities and polytechnics offering approved degree courses. One officer is a student and the other a member of the academic staff. Student membership entitles you to join the Graduates and Students section of the Institution...

Graduate Member

Upon graduation and entering employment in civil engineering, the Student member will be transferred to Graduate member...

At this stage the graduate commences training to become a Chartered Engineer. The training prepares the graduate to take the Institution's Professional Examination which is in two parts: PE1 and PE2

Preparation for the Professional Examination

To prepare for PE1 it is desirable that the graduate should enter into a training agreement registered with the Institution. The Institution publishes a list of about 1000 organisations which are approved for training. These include consulting engineers, contractors, local and central government, private and nationalised industries. Each organisation has one or several senior engineers approved by the Institution, called Supervising Civil Engineers, who have the responsibility to see that the graduate receives structured training. Each Supervising Civil Engineer is required to submit to the Institution a plan of training objectives for approval. The Institution has a training office and five Regional Training Officers who visit all graduates at regular intervals to give advice and check their training. A training agreement normally lasts for three years. If the graduate is unable to obtain training under agreement he/she will need to acquire experience in lieu of training and preparation for the Professional Examination will take much longer. During training the graduate is required to continue his/her education by attending short continuing education and training courses at post-graduate level.

Most graduates will gain experience in general civil engineering works but some will have worked in specialist areas and in research. The Institution gives advice on the experience which graduates should have obtained before presenting themselves for PE1 in The Route to Corporate Membership ICE 43 (Post Chilver). After passing PE1 the candidate may become an Associate Member of the Institution (AMICE).

The Associate Member continues to increase his/her professional experience and undertakes further continuing education at post-graduate level. After, normally, three years of further experience the Associate Member may apply to take the second part of the Professional Examination PE2. Before taking PE2 the candidate's whole academic record is assessed. The expected academic background of a typical candidate would be: an approved degree in civil engineering, three A levels at an average of grade C and several O levels. The Institution regards English

and a foreign language at least at O level as of particular importance. Full details of the academic qualifications assessed are published by the Institution in Desirable Level of Academic Attainment for Corporate Membership.

Chartered Engineer and Member of the Institution of Civil Engineers CEng MICE

After passing PE2 the candidate may become a Member of the Insitution of Civil engineers (MICE). The Institution will register his/her name with the Engineering Council as a Chartered Engineer (CEng).

THE INSTITUTION OF STRUCTURAL ENGINEERS

Student Member

You may become a Student member of the Institution of Structural Engineers if you are intending to become either a Chartered Structural Engineer or Technician Engineer providing that an approved degree course or course leading to qualification as a Technician Engineer has been commenced...

To achieve the level of technical competence required as a Chartered Structural Engineer a student must reach the proper academic standard (usually equivalent to a UK degree in civil engineering), complete a period of formal training (detailed in a log book) and complete a specified period in a position of responsibility. Following this three-part preparation a candidate must then obtain a pass in a test of professional competence - the Institution Part 3 Examination.

Graduate Member

Upon graduation you may transfer to a Graduate member and commence a period of approved training. A Graduate member does not need formally to register under an approved training scheme. A Graduate would however be required to undergo controlled training supervised by a Chartered Engineer as laid down in the Record of Practical Training (logbook) over a period of three

years or be able to offer five years' practical experience. After an appropriate period of training the Institution's Part 3 Examination must be taken.

Part 3 Examination

The examintion is held in the United Kingdom and overseas. It is a test of the candidate's professional competence and takes the form a 7-hour paper Structural Engineering Design and Practice. The candidate is called upon to demonstrate the soundness of his/her academic knowledge, the quality of training received and ability to exercise professional judgment. The examiner will expect the work to show:

a grasp of structural engineering principles;

an ability to initiate structural design;

an ability to communicate design intentions to the Technician Engineers and others who will have the task of developing the design and detailed drawings for use on site.

Upon passing the examination the candidate is required to submit full details of experience over four years, including two years' training; or six years' practical experience in lieu.

Chartered Engineer and Member of the Institution of Structural Engineers (CEng MIStructE)

If the candidates is judged to be in a post of sufficient responsibility he/she will be admitted as a Member of the Institutioc of Structural Engineers (MIStructE) and registered with The Engineering Council as a Chartered Engineer (CEng). Full details of qualificatioc as MIStructE are given in Admission to Corporate Membership of the Institution of Structural Engineers.

(Extract from Admission to Corporate Membership of the Institution of Structural Engineers published by The Institution of Structural Engineers (January 1985).)

Mature Candidates

The Council will consider an application for Membership from a candidate who has considerable experience and responsibility as a structural engineer and who but for the absence of a formal academic qualification might be eligible for corporate membership of the Institution and registration with the Board for Engineers Registration of the Engineering Council as a Chartered Engineer.

Full details of the application procedure to be followed in such a case are contained in the separate leaflet obtained on application to the Secretary, Admission to Corporate Membership of the Institution as a Mature Candidate. The following points should be noted:

i) a mature candidate must be over 40 years of age at the date of application;

ii) evidence acceptable to the Council of experience in appointments of increasing responsibility in structural engineering over a period of at least 15 years must be supplied;

iii) the candidate must hold an appointment demonstrating proven competence that would be acceptable evidence of training and experience had the normal academic requirements been satisfied.

It will not be essential that a mature candidate produces evidence of a good general and scientific education nor will earlier academic failure to be a bar to acceptance. Proof must however be established by the submission of a written thesis and by completion of an interview (which will be assessed/monitored in association with the EC) that the candidate, if he were elected a corporate member, would be accepted by the EC for registration as a Chartered Engineer. Candidates whose acceptance by the EC is so established will be referred by the

Institution to the Part 3 examination to complete the Institution's requirements for admission to corporate membership.

It should be noted that the preparation of a thesis and the submission to an interview under these regulations is in lieu of completing the required academic qualifications as defined by the EC for Chartered Engineer registration. It follows that a person who is already a Chartered Engineer by virtue of membership of another institution is not eligible to apply for corporate membership of the Institution as a mature candidate.

FEU

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Objectives

The objects for which **The Further Education Unit (FEU)** is established are to promote, encourage and develop the efficient provision of further education in the United Kingdom and for that purpose:
a) to review and evaluate the range of existing further education curricula and programmes and to identify overlap, duplication, deficiencies and inconsistencies therein;
b) to determine priorities for action to improve the provision of further education and to make recommendations as to how such improvements can be effected;
c) to carry out studies in further education and to support investigations of and experimentation in, and the development of further education curricula and to contribute to and assist in the evaluation of initiative in further education;
d) to disseminate and publish information and to assist in the dissemination and publication of information about recommendations for and experiments and developments in further education.

A limited number of extra copies of this report are available from

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